

REMARKS

Accompanying this Response is a Petition for Revival of an Application for Patent Abandoned Unintentionally under 37 C.F.R. § 1.137(b), together with the applicable fees.

Claims 1, 2, 4-7, and 9-18 are all the claims presently pending in the application. Claim 3 is withdrawn from consideration as being directed to a non-elected species of the invention. Claims 1, 3, 5-7, 10, and 11 have been amended to conform with U.S. patent practice. Claims 7 and 10 are amended to incorporate the features of claim 8. Claim 8 correspondingly is canceled without prejudice or disclaimer. Claims 13-18 have been added to provide more varied protection for the invention and to claim additional features of the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability.

Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicants gratefully acknowledge that claims 11 and 12 are allowed.

Claims 1, 2, and 4-10 stand rejected on prior art grounds. Claims 1, 2, and 4-6 stand rejected under 35 U.S.C. § 102(e) ad being anticipated by Jones, et al. (U.S. Patent No. 6,417,899; hereinafter “Jones”). Claims 7-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jones, et al. in view of Yoshihiro (JP 9-331066).

These rejections are respectfully traversed in the following discussion.

I. ALLOWABLE SUBJECT MATTER

Claims 11 and 12 are allowed.

II. THE CLAIMED INVENTION

The claimed invention is directed to a liquid crystal display having improved brightness.

In an illustrative, non-limiting embodiment of the present application, as defined by independent claim 1, a liquid crystal display panel includes an array substrate on which a driving element for controlling a driving voltage and a display electrode to which a voltage is applied through the driving element are formed, a first polarization layer for polarizing the light passing through the array substrate, a liquid crystal layer having a liquid crystal material, a color filter substrate on which a color filter made of a color material film is formed, and a second polarization layer for polarizing the light passing through the color filter substrate, wherein the array substrate, the first polarization layer, the liquid crystal layer, the color filter substrate, and the second polarization layer are successively superposed.

In another exemplary embodiment of the present application, as defined by independent claim 4, the light reflected from the array substrate of the liquid crystal display panel directly returns to the backlight unit without passing through other layers.

In another exemplary embodiment of the present application, as defined by independent claim 7, a display electrode and a wiring conductively connected to the display electrode are formed on the array substrate and the reflection film is formed on a gap between the display electrode and the wiring.

In another exemplary embodiment of the present application, as defined by independent claim 10, the metal film is formed on a gap between the display electrode and the driving element.

Conventional liquid crystal display devices improve the brightness by increasing the aperture ratio by increasing the number of backlights or increasing the capacity of the backlight of the device. However, these solutions increase the size and weight of the device, which is disadvantageous for many applications, such as a liquid crystal display for a notebook-type personal computer.

The claimed invention, on the other hand, provides a liquid crystal display having improved brightness resulting from improved light-recycling efficiency, as opposed to increasing the aperture ratio.

That is, in the claimed invention, the polarization plate is not disposed between the array substrate and the light guide plate, thereby reducing absorption of the reflected light by the polarization plate and improving light-recycling efficiency and brightness of the liquid crystal display (e.g., see specification at page 7, lines 16-28).

III. CLAIM REJECTIONS BASED ON PRIOR ART GROUNDS

A. Claims 1, 2, and 4-6:

Claims 1, 2, and 4-6 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Jones. For at least the following reasons, Applicants respectfully traverse this rejection.

With respect to independent claim 1, the Office Action alleges that Jones discloses “*an array substrate (3) having a driving element (thin film transistors, TFT's), a display electrode*

(7)". However, Applicants respectfully submit that the Examiner is paraphrasing the language of claim 1 and should consider the actual language of the claim in applying the reference.

For example, independent claim 1 recites, *inter alia*:

an array substrate on which a driving element for controlling a driving voltage and a display electrode to which a voltage is applied through the driving element are formed;

a first polarization layer for polarizing the light passing through the array substrate;

a liquid crystal layer ...;

a color filter substrate ...; and

a second polarization layer ...,

wherein the array substrate, the first polarization layer, the liquid crystal layer, the color filter substrate, and the second polarization layer are successively superposed.

That is, in the claimed invention, a driving element for controlling a driving voltage and a display electrode to which a voltage is applied through the driving element are formed on the array substrate, not on the first polarization layer. The driving element and display electrode reflect light and return it back to the backlight unit.

Thus, since the polarization layer is not formed between the substrate and the driving element or the substrate and the display electrode, the light reflected by the driving element and display electrode returns to the backlight unit without passing through the polarization layer (e.g., see specification at page 7, lines 18-23). Accordingly, the light-recycling efficiency and brightness of the liquid crystal display can be improved.

In comparison, Figure 2 of Jones discloses a polarization layer 53 and an orientation layer 55 disposed between the substrate 3 and the other layers of the display panel, including the pixel electrodes 7 (i.e., display electrode) and the common electrode 15.

That is, the pixel electrode 7 is formed on the polarization layer 53, not on the substrate 3. Thus, any light from the backlight that is reflected from the other layers necessarily would pass

through the polarization layer 53 and the orientation layer 55 before reaching the backlight 51.

Since the polarization layer has a light absorbing characteristic, some of the reflected light would be absorbed by the polarizer before reaching the backlight, thereby wasting the light and reducing the light-recycling efficiency.

Thus, Jones would not provide the benefits of the claimed invention, and instead, appears to suffer from the specific problem mentioned in the Background section of the application and being addressed by the claimed invention. Accordingly, Applicants submit that Jones neither discloses nor suggests all of the features of the claimed invention and respectfully requests that the Examiner withdraw this rejection.

Moreover, the display of Jones does not appear to reflect much of the light, if at all, from back toward the backlight 51. That is, contrary to the novel and unobvious aspects of the present invention, Jones does not appear to recycle the light from the backlight.

For example, Jones discloses a substantially transparent substrate 3, as well as a substantially transparent pixel electrode 7, pixel electrode 15, orientation layer 55, and orientation layer 9. In fact, Jones specifically states that “all alignment layers 19, 55, 63, 9, 13, 102, 106, 93, and 87 are preferably substantially transparent to visible light rays, as are all pixel electrodes discussed and illustrated herein” (e.g., see column 13, lines 17-20; see also column 6, lines 2-3 and 8-9; emphasis added).

Jones also discloses a black matrix on the color filter side of the display panel. Applicants submit that the black matrix would absorb light rather than reflect light, thereby wasting light (e.g., see specification at page 9, lines 22-23).

Thus, Jones does not appear to reflect or recycle light back to the backlight.

Moreover, even if the layers of Jones would reflect the light back to the backlight, the light necessarily would pass through the polarizer layer 53 before reaching the backlight, which would result in light being absorbed by the polarization layer 53, thereby worsening the light-recycling efficiency.

For at least these reasons, Applicants submit that Jones neither discloses nor suggests all of the features of independent claim 1 and respectfully requests that the Examiner withdraw the rejection of claims 1 and 2.

With respect to independent claim 4, Applicants submit that Jones neither discloses nor suggests all of the features of claim 4 for reasons similar to those set forth above.

For example, independent claim 4 recites, *inter alia*, that “the light reflected from the array substrate of the liquid crystal display panel directly returns to the backlight unit without passing through other layers” (emphasis added).

As set forth above, any light reflected by the layers of Jones necessarily would pass through at least the polarizer layer 53 before reaching the backlight, which would result in light being absorbed by the polarization layer 53, thereby worsening the light-recycling efficiency.

Thus, Applicants submit that Jones neither discloses nor suggests all of the features of independent claim 4 and respectfully requests that the Examiner withdraw the rejection of claims 4-6.

To summarize, Applicants respectfully submit that there are elements of claims 1, 2, and 4-6 that are neither discloses nor suggested by Jones, and therefore, respectfully requests that the Examiner withdraw the rejection of these claims.

B. Claims 7-10:

Claims 7-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jones in view of Yoshihiro. Applicants respectfully traverse this rejection for the following reasons.

Claims 7 and 10 are amended merely to incorporate the features of claim 8. Claim 8 correspondingly is canceled without prejudice or disclaimer.

Independent claim 7 recites, *inter alia*, that “a display electrode and a wiring conductively connected to the display electrode are formed on the array substrate” and that “the reflection film is formed on a gap between the display electrode and the wiring.”

Similarly, independent claim 10 recites, *inter alia*, that “the metal film is formed on a gap between the display electrode and the driving element.”

Applicants submit that neither Jones nor Yoshihiro, either alone or in combination, discloses or suggests at least these features of the independent claims 7 and 10.

Yoshihiro teaches a light shielding with two layer metals. However, Yoshihiro does not disclose or suggest disposing the metal layers between the electrodes and wiring, or the electrodes and driving element, as shown in the exemplary embodiments depicted in Figures 5 and 7 of the present invention.

In the claimed invention, the reflection film is formed on a gap between the display electrode and the wiring. This additional reflection layer prevents light loss of the disclination area (alignment disorder of liquid crystal) and reflects the emitted light from the backlight directly.

Applicants submit that, assuming *arguendo* that the alleged combination of Jones and Yoshihiro teaches a contrast improvement for LCD, such a combination still would not teach or

suggest improving the brightness by recycling the emitted light from backlight, according to the claimed invention.

Thus, Applicants respectfully submit that there are elements of claims 7, 9, and 10 that are neither disclosed nor suggested by Jones or Yoshihiro, either alone or in combination, and therefore, respectfully requests that the Examiner withdraw the rejection of these claims.

IV. REQUEST FOR REJOINDER OF NON-ELECTED SPECIES

Applicants respectfully request that the Examiner rejoin and allow non-elected claim 3 based on its dependency from generic claim 1.

V. NEW CLAIMS

New claims 13-18 are added to provide more varied protection for the present invention.

Applicants submit that claims 13-18 are allowable for reasons similar to those set forth above.

VI. FORMALITIES AND CONCLUSION

The Examiner is again requested to consider the references (e.g., JP 60-34095 and JP 63-121823) submitted in the IDS of January 18, 2001. It is noted that the IDS was in full compliance with M.P.E.P. § 609 AND 37 C.F.R. § 1.98. It is noted that a concise statement of relevance for the reference is found at page 2, lines 25-29 of the present application. For the Examiner's convenience, another PTO-1449 form for the January 18, 2001 IDS is attached hereto for the Examiner's consideration and initials.

Also, the Examiner is again requested to consider each of the six (6) references (i.e., JP 07-270782, JP 09-230373, JP 10-325951, JP 10-020294, JP 04-075025, and JP 62-58431) cited on page 2 of 2 of the IDS filed on October 31, 2002. It is noted that the IDS was in full compliance with M.P.E.P. § 609 AND 37 C.F.R. § 1.98, since English language Abstracts of the cited references were submitted with the IDS. For the Examiner's convenience, another PTO-1449 form for the October 31, 2002 IDS is attached hereto for the Examiner's consideration and initials.

The Office Action objects to Figures 11 and 12 because they have not been designated as "prior art". Figures 11 and 12 are amended herewith to include the designation "prior art" as suggested by the Examiner. Therefore, the Examiner is requested to withdraw this objection.

In view of the foregoing, Applicants submit that claims 1, 2, 4-7, and 9-18, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

Date: APRIL 27, 2004

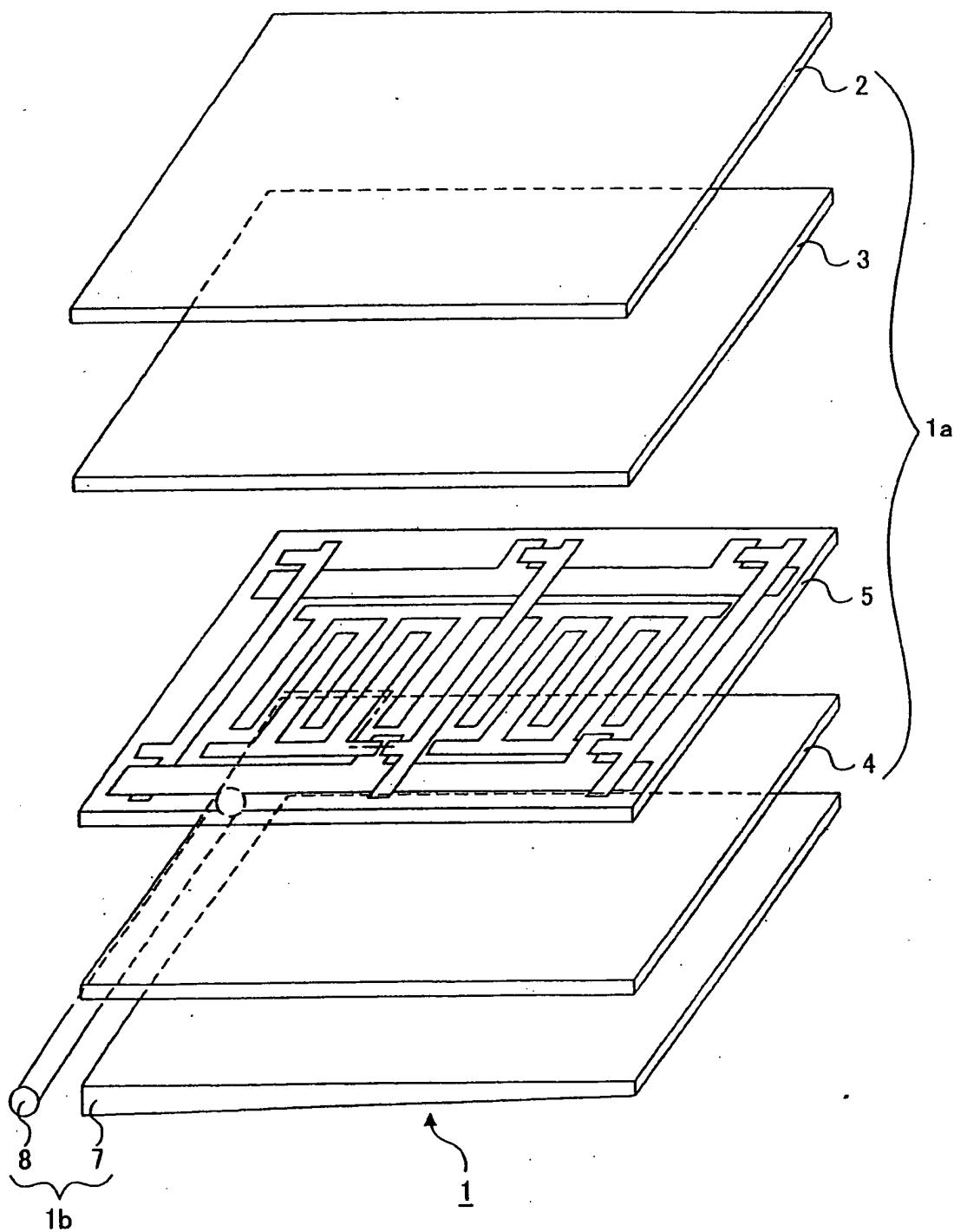

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[Figure 11] PRIOR ART

(11/12)



[Figure 12] PRIOR ART

(12/12)

